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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,536	05/08/2001	Jonathan Creasey	GJEL:0002/FLE SAH01509US	2589
27896	7590	07/28/2005	EXAMINER	
EDELL, SHAPIRO & FINNAN, LLC 1901 RESEARCH BOULEVARD SUITE 400 ROCKVILLE, MD 20850			MISLEH, JUSTIN P	
			ART UNIT	PAPER NUMBER
			2612	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,536

Applicant(s)

CREASEY ET AL.

Examiner

Justin P. Misleh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, and 4 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, and 4 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 May 2005 has been entered.

Response to Arguments

2. Applicant's arguments filed 19 May 2005 have been fully considered but they are not persuasive.

3. Applicant asserts that Howorth in view of Valdna fails on the basis that Howorth disclose an anti-stokes phosphor and Valdna does not disclose an anti-stokes phosphor. Applicant supports the assertion by attacking Valdna individually and specifically stating, "Valdna fails to teach an anti-stokes phosphor that emits in the range of 950 nm to 1075 nm" and that "the phosphor absorption range cannot be disregarded, because that is an indication of whether the phosphor follow Stokes Law or is an anti-stokes phosphor."

4. In response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, Applicant is

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reminded that the test for obviousness is not whether the features of a secondary reference (e.g. Valdna), may be bodily incorporated into the structure of the primary reference (e.g. Howorth); nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

5. In this case, the claim limitation “a charge-coupled device (CCD), the CCD having an anti-stokes phosphor bound to the light receiving surface thereof” was expressly provided by Howorth. In other words, Valdna was not used to provide an anti-stokes phosphor. Also, the Examiner clearly noted in the Final Office Action (10 March 2005), that Howorth did not provide a phosphor material that emits in the recited range and that Valdna overcame the Howorth deficiency by providing an emission in the recited range. Thus, Valdna was never used to teach an anti-stokes phosphor, as alleged by Applicant.

6. Furthermore, Valdna provides explicit motivation for an emission in the recited range (see column 1, lines 15 – 32). More specifically, Valdna indicates that [it would have been obvious for one with ordinary skill in the art to include] an emission in the recited range is provided for the advantage of matching the maximum quantum efficiency of the CCD while maintaining a low afterglow so as to achieve a high dynamic range and minimize ghost images and streaking. For these reasons, Applicant’s arguments are traversed.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1, 2, 4, and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howorth in view of Valdna et al. The Examiner's response to Applicant's arguments above is fully incorporated into these rejections.

9. For **Claim 1**, Howorth discloses, as shown in figure 2 and as stated on pages 2 (lines 21 – 33), 3 (lines 1 – 13), 10 (lines 23 – 25), 11 (lines 1 – 8), and in the abstract, a camera (see figure 2) comprising a charge-coupled device (CCD), the CCD (26) having an anti-stokes phosphor (29) bound to the light receiving surface thereof (the phosphor 29 is coupled to the light receiving surface of the CCD 26 by means of fiber optics 25); and a housing surrounding the CCD (26) and defining an aperture through which, in use, light can pass and be received by the phosphor (29; a housing is inherent or else the camera would be rendered ineffective for picture taking).

The phosphor is anti-stokes because the phosphor is sensitive to infrared radiation and emits visible radiation. Infrared radiation comprises wavelengths ranging from 1 micron to 750 nanometers and visible radiation comprises wavelengths ranging from 750 nanometers to 400 nanometers. The radiation energy is directly proportional to the radiation frequency. Since, the radiation frequency is inversely proportional to the radiation wavelength, longer wavelengths have less energy and shorter wavelengths have more energy. The phosphor (29) absorbs infrared

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radiation, which has longer wavelengths and less energy, and emits visible radiation, which has shorter wavelengths and more energy.

In summary, Howorth discloses that the phosphor (29) emits in the visible light range comprising wavelengths 750 nanometers to 400 nanometers, while Howorth does not disclose wherein the phosphor (29) emits in the near infrared range comprising wavelengths ranging from 1100 nanometers to 800 nanometers and accordingly does not disclose emitting in the range of 950 nanometers to 1075 nanometers.

On the other hand, Valdna et al. also disclose a phosphor. More specifically, Valdna et al. disclose, as stated in columns 1 (lines 15 – 50) and 3 (lines 63 – 66), an improved phosphor having a peak emission in the red or near-infrared wavelength range. The near-infrared wavelength range comprises wavelengths ranging from 800 nanometers to 1100 nanometers, which includes the wavelength range 950 to 1075 nanometers.

As stated in column 1 (line 15 – 32) of Valdna et al., at the time the invention was made, it would have been obvious for one with ordinary skill in the art to include a phosphor having a peak emission including wavelengths ranging from 950 nanometers to 1075 nanometers, as taught by Valdna et al. in the camera with phosphor, disclosed by Howorth, for the advantage of matching the maximum quantum efficiency of the CCD while maintaining a low afterglow so as to achieve a high dynamic range and minimize ghost images and streaking.

10. As for **Claim 2**, Howorth discloses, a camera (see figure 2) according to Claim 1, wherein the anti-stokes phosphor (29) is sensitive to light in the wavelength range of 1500 nm to 1610 nm.

As stated above, infrared radiation comprises wavelengths ranging from 1 micron to 750 nanometers, which fully incorporates 1500 to 1610 nanometers.

11. As for **Claim 4** (please see objection above), Howorth discloses, a camera (see figure 2) according to Claim 1, comprising at least one filter (image forming lens 21) positioned between the aperture (inherently provided) and the phosphor (29) on the CCD (26).

The image forming lens (21) focuses light onto the phosphor (29). The image forming lens (21) captures a limited field of view with respect to the three dimensional continuous environment that the camera is in when capturing images; therefore, the image forming lens (21) filters to the three dimensional continuous environment to form the capture field of view.

12. As for **Claim 7**, Howorth discloses, a camera according to Claim 1, wherein the phosphor (29) is bound to the CCD by an adhesive (optical cement 24). As stated in Claim 1, the phosphor (29) is bound to the CCD (26), wherein the phosphor (29) is coupled face-to-face via fiber optics (25) to the CCD (26) such that visible light emitted from the phosphor (29) is received by the CCD (26). The phosphor (29) is coupled to the fiber optics (25) by means of optical cement (24).

13. **Claims 5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howorth in view of Valdna et al. further in view of Ohwaki et al. The Examiner's response to Applicant's arguments above is fully incorporated into these rejections.

14. As for **Claim 5**, Howorth discloses a phosphor (29). However, Howorth in view of Valdna et al. do not disclose wherein the phosphor comprises ErYb in a host phosphor matrix.

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On the other hand, Ohwaki et al. also disclose a phosphor. More specifically, Ohwaki et al. disclose, as stated in columns 4 (lines 43 – 54) and 6 (lines 33 – 47), a phosphor comprising ErYb in a host phosphor matrix.

As stated in column 2 (lines 13 – 42) of Ohwaki et al., at the time the invention was made, it would have been obvious to one with ordinary skill in the art to include a phosphor comprising ErYb in a host phosphor matrix, as taught by Ohwaki et al., in the camera with phosphor, disclosed by Howorth in view of Valdna et al., for the advantage of providing a phosphor with a high conversion efficacy wherein the emitting intensity is not lowered.

15. As for **Claim 6**, Ohwaki et al. disclose, as stated in column 4 (lines 43 – 54), that the phosphor may be comprised of rare earth ions and fluorides, oxyfluorides, and oxychlorides. The claim language requires a host phosphor matrix comprising one of Y_2O_2S , YF_3 , $NaYF_4$ and La_2O_2S . Yttrium Fluoride (YF_3) is a fluoride and therefore, Ohwaki et al. meets the claim.

16. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Howorth in view of Valdna et al. in further view of Webber. The Examiner's response to Applicant's arguments above is fully incorporated into these rejections.

17. For **Claim 8**, Howorth discloses, as shown in figure 2 and as stated on pages 2 (lines 21 – 33), 3 (lines 1 – 13), 10 (lines 23 – 25), 11 (lines 1 – 8), and in the abstract, a camera (see figure 2) comprising a charge-coupled device (CCD), the CCD (26) having an anti-stokes phosphor (29) bound to the light receiving surface thereof (the phosphor 29 is coupled to the light receiving surface of the CCD 26 by means of fiber optics 25); and a housing surrounding the CCD (26) and defining an aperture through which, in use, light can pass and be received by the

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phosphor (29; a housing is inherent or else the camera would be rendered ineffective for picture taking).

The phosphor is anti-stokes because the phosphor is sensitive to infrared radiation and emits visible radiation. Infrared radiation comprises wavelengths ranging from 1 micron to 750 nanometers and visible radiation comprises wavelengths ranging from 750 nanometers to 400 nanometers. The radiation energy is directly proportional to the radiation frequency. Since, the radiation frequency is inversely proportional to the radiation wavelength, longer wavelengths have less energy and shorter wavelengths have more energy. The phosphor (29) absorbs infrared radiation, which has longer wavelengths and less energy, and emits visible radiation, which has shorter wavelengths and more energy.

In summary, Howorth discloses that the phosphor (29) emits in the visible light range comprising wavelengths 750 nanometers to 400 nanometers, while Howorth does not disclose wherein the phosphor (29) emits in the near infrared range comprising wavelengths ranging from 1100 nanometers to 800 nanometers and accordingly does not disclose emitting in the range of 950 nanometers to 1075 nanometers. In addition, Howorth does not disclose wherein the phosphor is directly bound to the light receiving surface of the CCD.

In regards to the phosphor emitting range, Valdna et al. also disclose a phosphor. More specifically, Valdna et al. disclose, as stated in columns 1 (lines 15 – 50) and 3 (lines 63 – 66), an improved phosphor having a peak emission in the red or near-infrared wavelength range. The near-infrared wavelength range comprises wavelengths ranging from 800 nanometers to 1100 nanometers, which includes the wavelength range 950 to 1075 nanometers.

As stated in column 1 (lines 15 – 32) of Valdna et al., at the time the invention was made, it would have been obvious for one with ordinary skill in the art to include a phosphor having a peak emission including wavelengths ranging from 950 nanometers to 1075 nanometers, as taught by Valdna et al. in the camera with phosphor, disclosed by Howorth, for the advantage of matching the maximum quantum efficiency of the CCD while maintaining a low afterglow so as to achieve a high dynamic range and minimize ghost images and streaking.

In regards to the directly bound phosphor, Webber also discloses a charge-coupled device (CCD) having a phosphor bound to the light receiving surface thereof. More specifically, Webber discloses, as shown in figures 20 and 21 and as stated in column 15 (lines 19 – 34), a charge-coupled device (731) having a phosphor coating applied directly to the light receiving surface thereof.

As stated in column 2 (lines 44 – 50) of Webber, at the time the invention was made, it would have been obvious for one with ordinary skill in the art to include a phosphor coating applied directly to the light receiving surface of a CCD, as taught by Webber, in the CCD having an anti-stokes phosphor, disclosed by Howorth, for the advantage of producing a three-dimensional representation of an object that is substantially free of blurring artifacts from unregistered details.

Cited Prior Art

18. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure at least for the reason that each teaches of a phosphor directly bound to the light receiving surface of a charge-coupled device (CCD).

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Conclusion

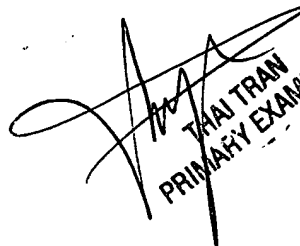
19. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 571.272.7313. The Examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, ^{Thai Tran} ~~Wendy R Garber~~ can be reached on 571.272.7382 ¹³⁸² ~~7308~~. The fax phone number for the organization where this application or proceeding is assigned is 571.273.3000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM

July 22, 2005


THAI TRAN
PRIMARY EXAMINER